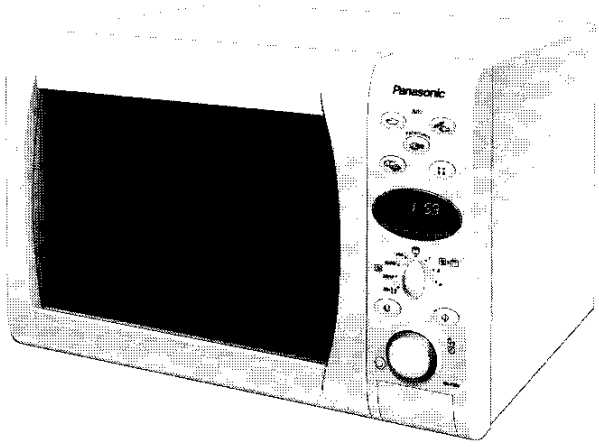
ORDER NO. MOP9910014C2

Service Manual

Microwave Oven

NN-F369WB
NN-F359WB

INVERTER
SYSTEM INSIDE



Specifications:

Power Source:	230 V AC Single Phase, 50 Hz
Power Requirements:	Microwave: 1170W, Grill: 1110W, Maximum: 1670W
Output: (IEC705-88)	900W
Microwave Frequency:	2,450Mhz
Timer:	99 min. 99 sec.
Oven Cavity Size:	20L
Outside Dimensions:	458mm (W) X 315mm (D) X 299mm (H)
Inside Dimensions:	310mm (W) X 298mm (D) X 220mm (H)
Weight:	13 Kg
Inverter Power Supply	
Output Power:	IEC705-88 Test procedure
Specifications subject to change without notice	

Panasonic

© 1999 Matsushita Electric Industrial Co., Ltd. All rights reserved. Unauthorized copying and distribution is a violation of law.

WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product dealt with in this service information by anyone else could result in serious injury or death.

WARNING

* This product should be serviced only by trained, qualified personnel.
This service manual covers products for following markets.
When troubleshooting or replacing parts, please refer to the country identifications shown below for your applicable product specification.
SPG ... for Scandanavian countries
WPG ... for Switzerland

DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

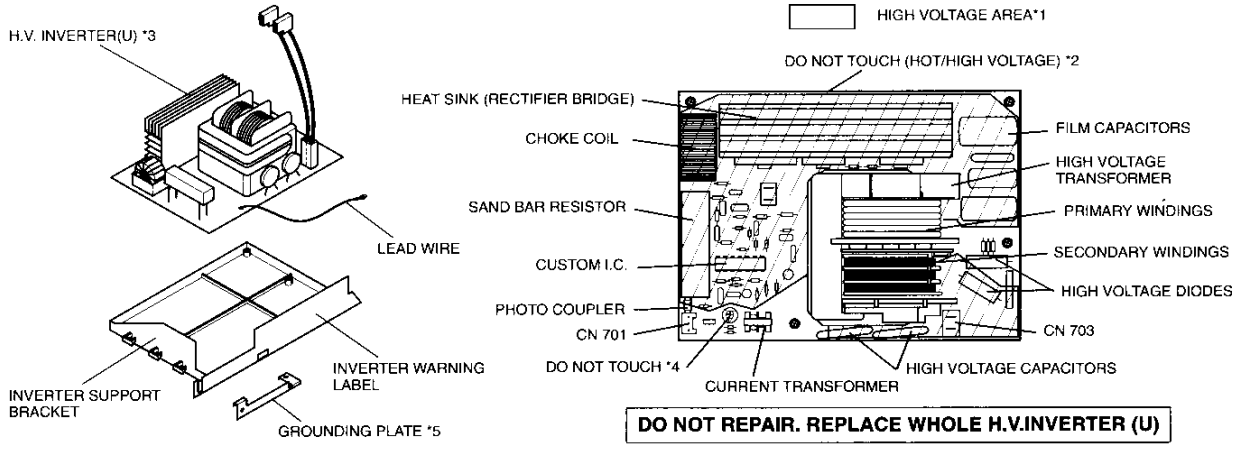
INVERTER WARNING NEW H.V.

This Inverter board looks like a regular PCB, however, this PCB drives the magnetron tube with extremely high voltage and high current.

IT HAS: 1: Very high voltage and high current circuit.
It functions the same as the high voltage transformer and high voltage capacitor in ordinary microwave ovens.
2. aluminium heat sink is very hot in high voltages and heat energy.
3. Very high voltage may remain in the circuitry even when the oven is off. High voltages may remain in the capacitors on the board.

DO NOT: *1. Do not touch the circuitry as it becomes very hot (high voltage). Even when replacing board, extreme care should be taken to avoid possible electric shock hazards. High voltage may remain in the circuit.
*2. Do not touch aluminium heat sink because it is very hot in high voltage and also very hot in high heat energy.
*3. Do not try to repair the Inverter PCB as this can be very dangerous. Replace the whole High Voltage Inverter Circuit (U) unit and return fully re-packed with the original shopping box and shipping materials.
*4. Do not try to adjust or tamper with the preset volume on the Inverter board because it is very dangerous to adjust it without proper test equipment.
*5. Do not test oven while Inverter grounding strip or screws are loose. It is very dangerous to operate the H.V. Inverter Circuit (U) with loose mounting screws or if improperly grounded.

INVERTER POWER SUPPLY DIAGRAM



DO NOT REPAIR. REPLACE WHOLE H.V.INVERTER (U)

TABLE OF CONTENTS

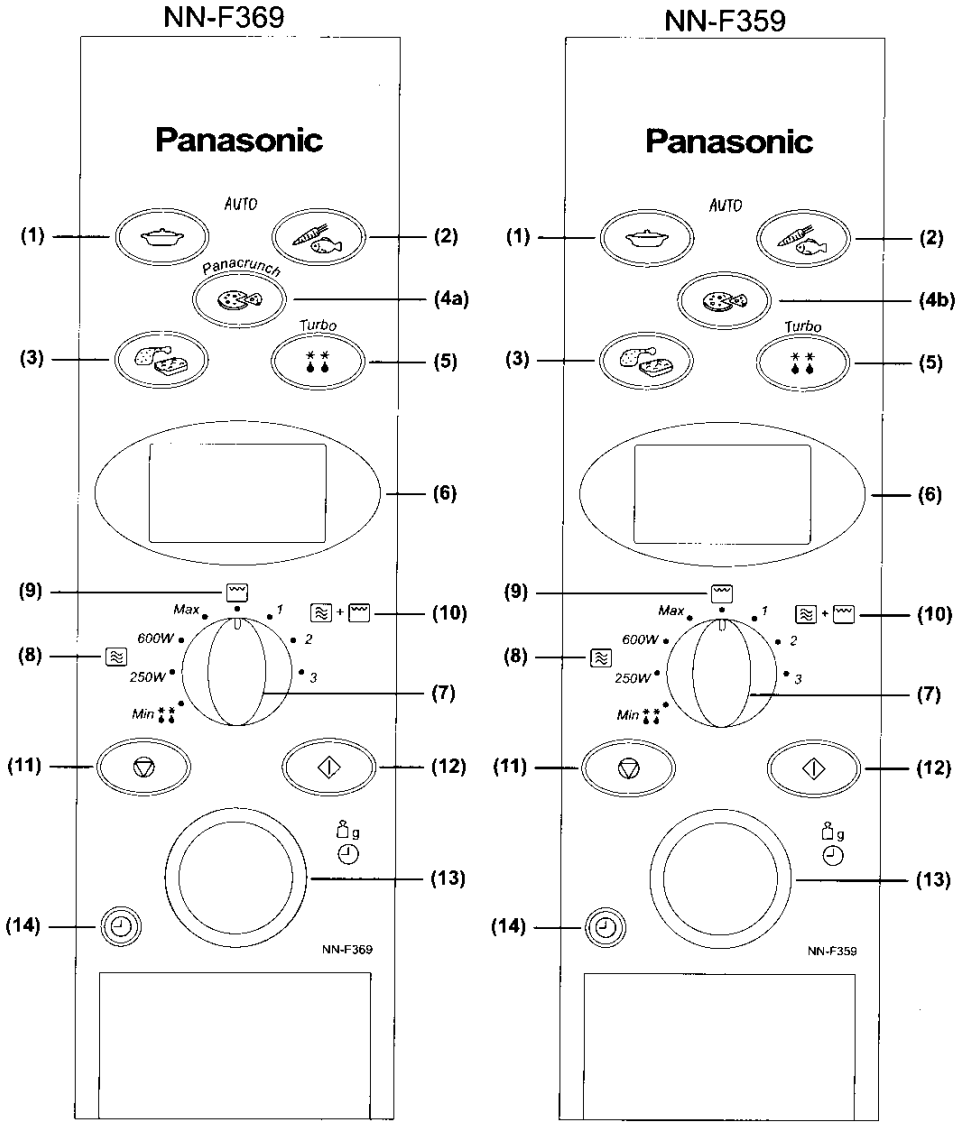
1. **CONTROL PANELS** 4
2. **OPERATION AND DIGITAL PROGRAMMER CIRCUIT TEST PROCEDURE** 5
3. **SCHEMATIC DIAGRAM** 8
4. **DESCRIPTION OF OPERATING SEQUENCE** 9
   - 4.1 Variable power cooking control 9
   - 4.2 Grill cooking 9
   - 4.3 Combination cooking 9
   - 4.4 Autoweight defrost, autoweight cook 9
5. **CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING** 10
   - 5.1 Check the grounding 10
   - 5.2 Inverter warnings 10
   - 5.3 When parts must be replaced, remove the power plug from the outlet 11
   - 5.4 When the 10A fuse is blown due to the operation of short switch: 11
   - 5.5 Avoid inserting nails, wire, etc. through any holes in the unit during operation 11
   - 5.6 Confirm after repair 11
   - 5.7 Sharp edges 11
6. **DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE** 20
   - 6.1 Magnetron 20
   - 6.2 Inverter power supply (U) 20
   - 6.3 Digital Programmer Circuit (DPC) and membrane key board 21
   - 6.4 Low voltage transformer and/or power relays (RY1) 21
   - 6.5 Fan motor 21
   - 6.6 Temp sensor (thermal protector) 21
   - 6.7 Door disassembly 22
   - 6.8 Turntable motor 22
   - 6.9 Quartz heater 22
7. **COMPONENT TEST PROCEDURE** 23
   - 7.1 Primary latch switch, secondary (secondary latch switch and power relay B) interlocks 23
   - 7.2 Short switch and monitor circuit 23
   - 7.3 Magnetron 23
   - 7.4 Push button key board 23
   - 7.5 Inverter power supply (U) 24
   - 7.6 Inverter power supply (U) 24
   - 7.7 Temp sensor (thermal protector) 24
8. **MEASUREMENTS AND ADJUSTMENTS** 25
   - 8.1 Installation of primary latch switch, secondary latch switch and short switch 25
   - 8.2 Measurement of microwave output 25
9. **TROUBLESHOOTING GUIDE** 26
10. **EXPLODED VIEW AND PARTS LIST** 30
11. **PARTS LISTS** 31
12. **DOOR ASSEMBLY** 32
13. **ESCUTCHEON BASE ASSEMBLY** 33
14. **PACKING AND ACCESSORIES** 34
15. **DIGITAL PROGRAMMER CIRCUIT** 36
16. **DIGITAL PROGRAMMER CIRCUIT - PARTS LIST** 38

FEATURE CHART

FEATURES	NN-F359	NN-F369
Microwave	4	4
Grill	1	1
Combination	3	3
Weight Defrost	2	2
Weight Combination	5	4
Weight Reheat	4	4
Weight Cook	2	2
Weight Crisp	-	1
Delay Stand	Yes	Yes
Clock	24 Hrs	24 Hrs
Word Prompt	* Note	* Note

*** NOTE:** None, Danish, German, French, Italian, English, Finnish, Swedish, Norwegian.

1. CONTROL PANELS



(1) Auto Weight Reheat
(2) Auto Weight Cook (NN-F369/NN-F359)
(3) Auto Weight Combination (NN-F369/NN-F359)
(4a) Auto Weight Panacrunch (NN-F369)
(4b) Auto Weight Pizza (NN-F359)
(5) Auto Weight Defrost
(6) Display Window
(7) Mode Selector Dial
(8) Microwave Power
(9) Grill Power
(10) Combination Power

(11) Stop/Cancel Button:
Before cooking: One press clears your instructions.
During cooking: One press temporarily stops the cooking program. Another press cancels all your instructions and the time of day will appear in the display.

(12) Start Button:
Press to start operating the oven. If during cooking the door is opened or Stop/Cancel Button is pressed once, Start Button has to be pressed again to continue cooking.

Beep Sound
A beep sounds when a button is pressed. If this beep does not sound, the setting is incorrect. When the oven changes from one function to another, two beeps sound. After completion of cooking, five beeps sound.

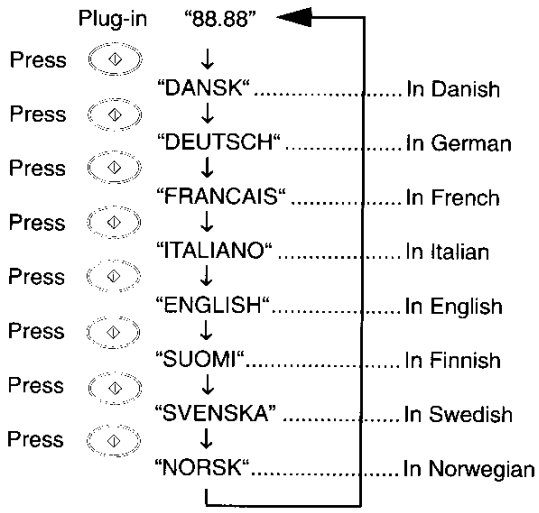
(13) Time/Weight Dial
(14) Clock/Timer Button

2. OPERATION AND DIGITAL PROGRAMMER CIRCUIT TEST PROCEDURE

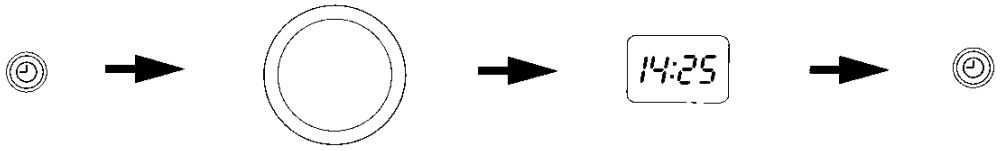
1. WORD PROMPTING

These models have a unique function "Word Prompting" which guides you through the operation of your microwave. After plugging in the oven press the Start Button until you locate your language. As you press the buttons, the display will scroll the next instruction, eliminating the opportunities for mistakes.

If for any reason you wish to change the language displayed, unplug the oven and repeat the procedure.



2. CLOCK SETTING



Example: To set 14:25

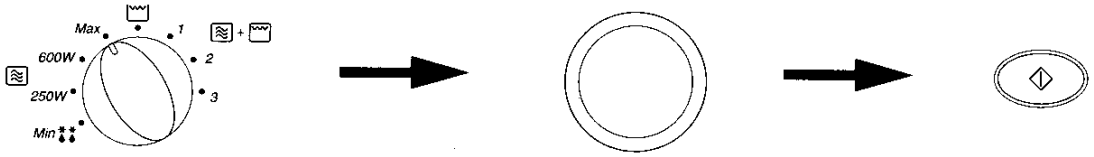
Press Clock/Timer Button twice.
The colon starts to blink.

Enter the time by turning the Time/ Weight Dial.
The time appears in the display and the colon blinks.

Press Clock/Timer Button.
The colon stops blinking and the time of day is entered.

3. MICROWAVE COOKING AND DEFROST

Power Level	Wattage
MAX (HIGH) Power	900W
MEDIUM Power	600W
SIMMER Power	250W
MIN (DEFROST) Power	270W



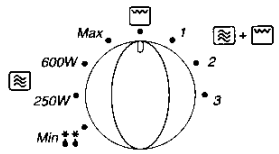
Turn Mode Selector Dial to your desired power level.

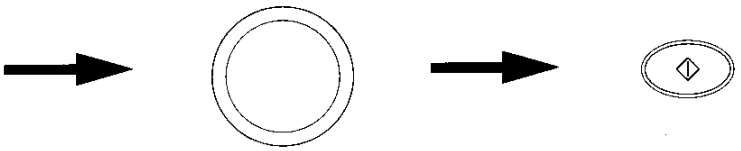
Set the cooking time using the Time/Weight Dial (HIGH power: up to 30 minutes Other powers: up to 99 minutes).
The display will alternate between the start prompt, the power level and the set cooking time. The microwave symbol will also be displayed.

Press Start Button.

4. GRILLING

The Grill provides 1 Grill setting of 1100W.





Turn Mode Selector to Grill setting.

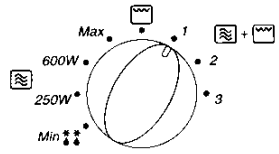
Set the cooking time using the Time/Weight Dial (up to 99 minutes). The display will alternate between the start prompt and the set cooking time. The grill symbol will also be displayed.

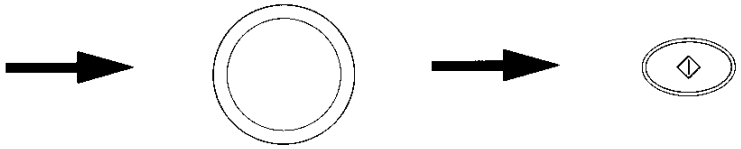
Press Start Button.

5. COMBINATION COOKING

There are 3 combination settings. The following chart shows the approximate wattage for each power level.

Combination Setting	Grill	Microwave	Word Prompt
1	100W	440W	G1-440W
2	1100W	250W	G1-250W
3	950W	440W	G2-440W





Turn Mode Selector to desired Combination setting.

Set the cooking time using the Time/Weight Dial (up to 99 minutes). The display will alternate between the start prompt, combi level and the set cooking time. The microwave and grill symbol are also displayed.

Press Start Button.

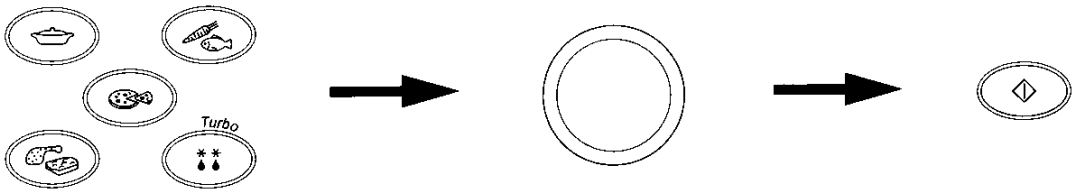
6. AUTO DEFROST

Select the desired Auto Defrost Program.
1 press for small pieces
2 presses for big pieces

Set the weight of the frozen food by using the Time/Weight dial.
Turn clockwise, weight counts-up in 10g increments.
Turn anti-clockwise, weight counts-down in 10g increments.

Press Start Button.

7. AUTO WEIGHT PROGRAMS

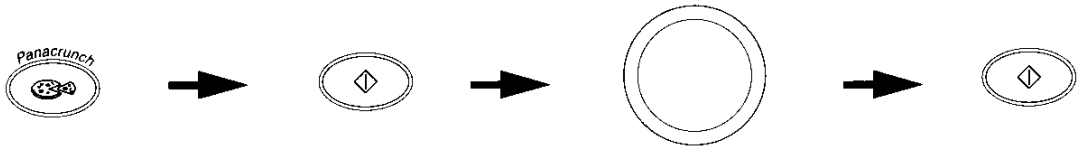


Select the desired Auto Weight Program.

Set the weight of the food by using the Time/ Weight Dial.
Turn clockwise, weight counts-up in 10g increments.
Turn anti-clockwise, weight counts-down in 10g increments.
The start prompt will be indicated.

Press Start Button.

8. PANACRUNCH PROGRAM (NN-F369 only)



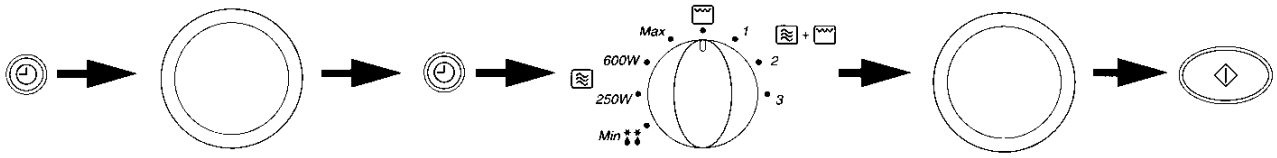
Select the desired program and place the pizza pan in the oven directly on the glass tray.

Press the start button to pre-heat the pizza pan.

After pre-heating beeps sound, place the food in the pan, set weight.

Press Start Button.

9. DELAY START COOKING



Press Clock/ Timer Button once.

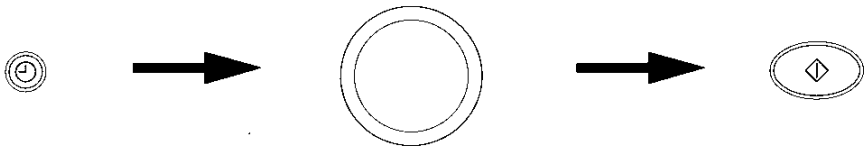
Set the delay time by turning the Time/Weight Dial.
(up to 9 hours 90 minutes).

Press Clock/ Timer Button again.

Set the desired cooking program by using Mode Selector dial and Time/Weight Dial.

Press Start Button.

10. TIMER.

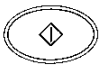


Press Clock/Timer Button once.

Set the desired amount of time by using the Time/Weight Dial.
(up to 9 hours 90 minutes).

Press Start Button.

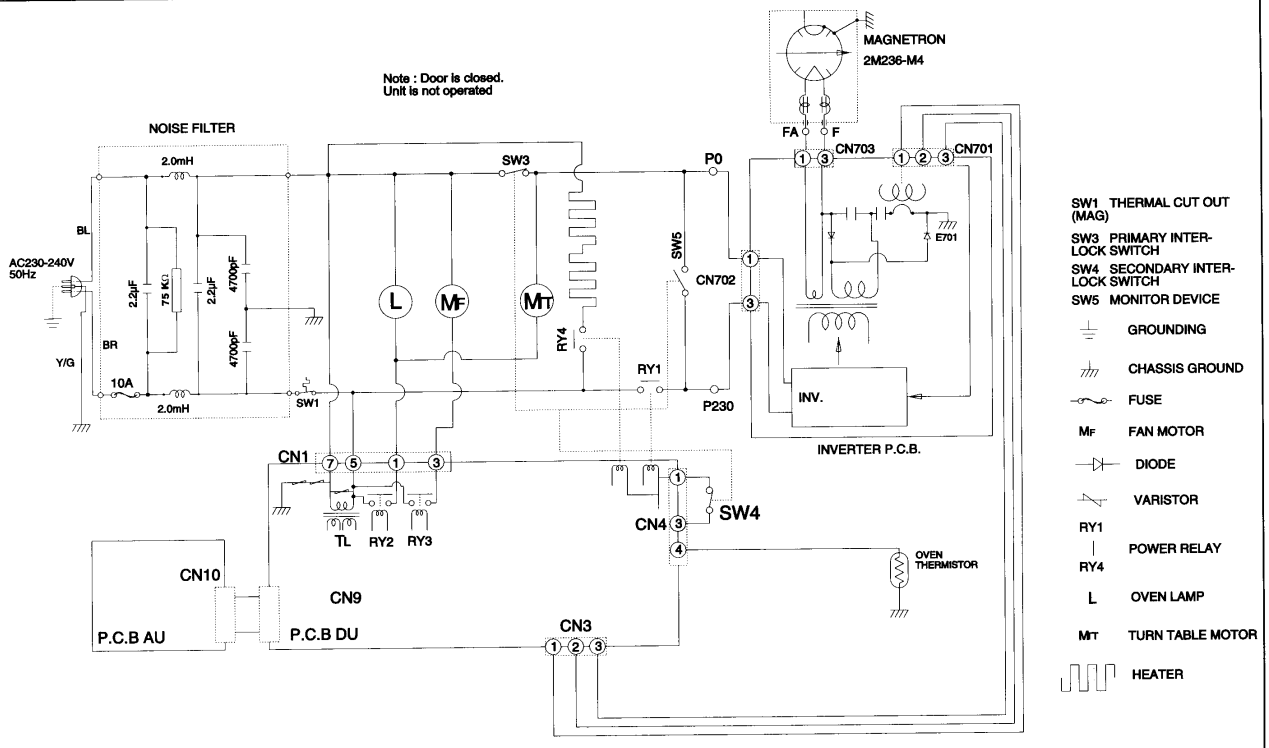
11. CHILD SAFETY LOCK



To Set:
Press Start Button three times.
The time of day will disappear.
Actual time will not be lost.
A * is indicated in the display.

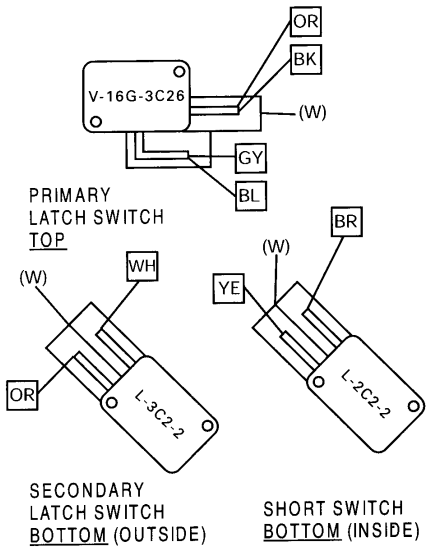
To Cancel:
Press Stop/Cancel Button three times.
The time of day will reappear in the display.

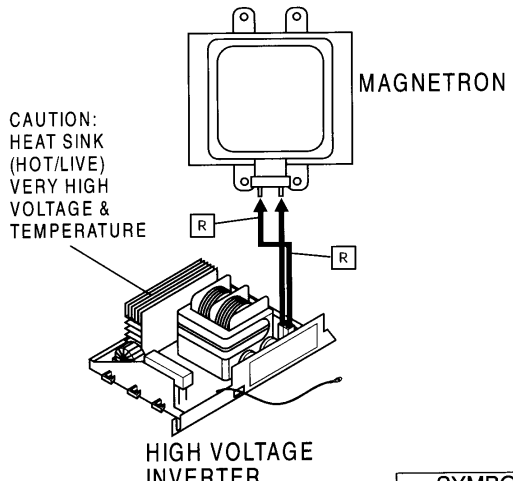
3. SCHEMATIC DIAGRAM

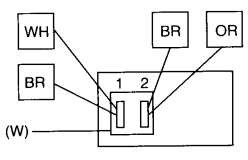


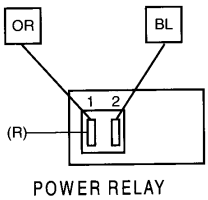
WIRING DIAGRAM

NOTE: *When replacing, check the lead colour as shown.
*Colours shown by ( ) indicate colours of leadwire connector housing.









SYMBOL	COLOUR
OR	ORANGE
BL	BLUE
BR	BROWN
W	WHITE
Y	YELLOW
R	RED
GY	GREY
B	BLACK

4. DESCRIPTION OF OPERATING SEQUENCE

4.1 Variable power cooking control

HIGH VOLTAGE INVERTER POWER SUPPLY (U) controls output power by a signal from Digital Programmer Circuit (DPC). Power relay 1 stays on to supply power to the inverter circuit. The outpower is controlled by the drive signal level from the inverter circuit.

NOTE 1: The ON/OFF time ratio does not correspond with the percentage of microwave power since approximately 2 seconds are required for heating of magnetron filament.

NOTE 2: If microwave cooking is over 8 minutes with HIGH power, fan motor rotates for 1 minute after cooking to cool oven and electric components.

4.2 Grill cooking

The digital programmer circuit operates power relay 4 in the sequence as shown in the table

4.3 Combination cooking

Combination cooking is accomplished by microwave and grill cooking. The digital programmer circuit controls ON-OFF time of power relay 4 and the inverter control signal level, as shown in the table.

NOTE: After grill and combination cooking, fan motor rotates for 1 minute to cool oven and electric components.

4.4 Autoweight defrost, autoweight cook

When those auto control feature is selected and Start pad is pressed:

1. The digital programmer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display. The table shows the corresponding cooking times for respective weight by categories.
2. When cooking time in the display window has elapsed, the oven turns off automatically by the controlled signal from the digital programmer circuit.

NOTE: After one touch menu and auto reheat cooking, fan motor rotates for 1 minute to cool oven and electric components.

VARIABLE POWER COOKING

POWER SETTING	OUTPUT POWER APPROX.	RY-1	INVERTER CONTROL SIGNAL
HIGH	900W	stay ON	stay ON
DEFROST	270W	stay ON	ON/OFF
MEDIUM	600W	stay ON	stay ON
LOW	440W	stay ON	stay ON
SIMMER	250W	stay ON	ON/OFF
WARM	100W	stay ON	ON/OFF

GRILL COOKING

GRILL NO.	HEATER (RY-4)	
	ON (SEC)	OFF (SEC)
1	33	0

COMBINATION COOKING

COMBINATION NO.	HEATER (RY-4)		MICROPOWER LEVEL		
	ON (SEC)	OFF (SEC)	LOW	SIMMER	WARM
1	33	0	-	-	0
2	33	0	-	0	-
3	33	0	0	-	-

AUTOWEIGHT DEFROST

CATEGORY	WEIGHT	COOKING TIME
1. SMALL PIECES	500g	7m 5s
2. BIG PIECES	1000g	21 40s

AUTOWEIGHT REHEAT

CATEGORY	WEIGHT	COOKING TIME
1. REHEAT MUG	250g	2m 5s
2. REHEAT CUP	150g	1m 15s
3. REHEAT FRESH MEAL	200g	2m
4. REHEAT FROZEN MEAL	200g	5m

WEIGHT COOK

CATEGORY	WEIGHT	COOKING TIME
5. COOK FRESH VEGETABLE	500g	10m 20s
6. COOK FRESH FISH	400g	6m 40s

WEIGHT COMBINATION

CATEGORY	WEIGHT	COOKING TIME
7. POULTRY PIECES	500g	11m 15s
8. PORK	1000g	30m
9. FROZEN BREAD	50g	3m 12s
10 FROZEN GRATIN LASAGNE	400g	14m 40s

WEIGHT COMBINATION PIZZA

CATEGORY	WEIGHT	COOKING TIME
11. FROZEN PIZZA	300g	10m 30s

PANACRUNCH NN-F369

CATEGORY	WEIGHT	COOKING TIME
11. FROZEN PIZZA	300g	13m 45s

5. CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high-voltage, high-current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

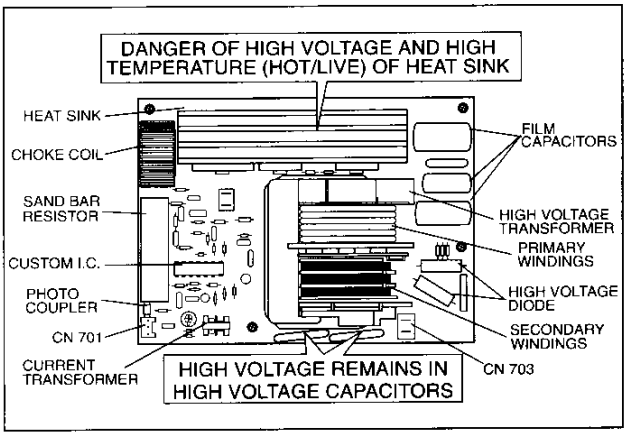
CAUTION
Servicemen should remove their watches whenever working close to or replacing the magnetron.

5.1 Check the grounding

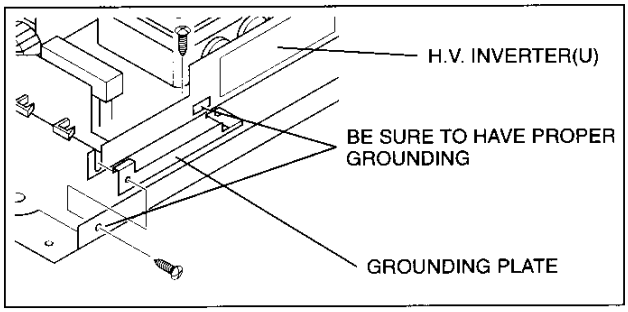
Do not operate on a 2-wire extension cord. The microwave oven is designed to be used when grounded. It is imperative, therefore, to make sure it is grounded properly before beginning repair work.

5.2 Inverter warnings NEW H.V.

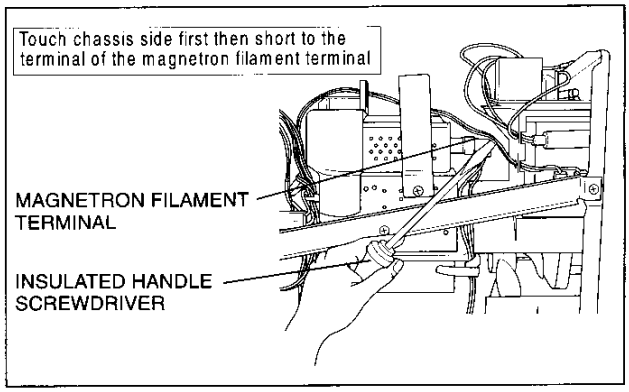
DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LINE) OF THE INVERTER POWER SUPPLY (U)
This High Voltage Inverter Power Supply circuit handles very high voltage and very high current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair. As you can see, it looks like a TV flyback transformer, however the current is extremely large and so danger exists by its high current and high voltages.
The aluminium heat sink is also energized with high voltage (HOT), so do not touch when AC input terminal is connected to the power devices (Collector) is directly connected to the Aluminium heat sink.
The Aluminium heat sink may be HOT by heat energy; therefore, extreme care should be taken during servicing and replacing.



WARNING OF INVERTER POWER SUPPLY (U) GROUNDING
Check the High Voltage Inverter Power Supply circuit grounding. This High Voltage Inverter Power Supply circuit board must have a proper chassis ground by the grounding bracket to the chassis ground; otherwise, this H.V. Inverter circuit board will expose very high voltage and cause extreme DANGER! Be sure to have proper grounding by the grounding plate and screws.



WARNING OF DISCHARGING HIGH VOLTAGE CAPACITORS
Warning about the electric charge in the high voltage capacitors. For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors in the inverter power supply circuit board.
When replacing or checking parts, remove the power plug from the outlet and short the Inverter output terminal of the magnetron filament terminals to the chassis ground with an insulated handle screwdriver to discharge. Please make sure to touch chassis ground side first then short to the output terminals.


Touch chassis side first then short to the terminal of the magnetron filament terminal
MAGNETRON FILAMENT TERMINAL
INSULATED HANDLE SCREWDRIVER

WARNING
There is high-voltage present, with high-current capabilities in the circuits of the primary, and secondary windings, choke coil and heat sink of the Inverter. It is extremely dangerous to work on or near these circuits with oven energized. DO NOT measure the voltage in the high voltage circuit including filament voltage of magnetron.

WARNING
Never touch any circuit wiring with your hand nor with an insulated tool during operation.

5.3 When parts must be replaced, remove the power plug from the outlet

5.4 When the 10A fuse is blown due to the operation of short switch:

WARNING

When the 10A 250V fuse is blown due to the operation of short switch, you must replace the primary latch switch and short switch. Also replace the power relay 1 (RY1) when the continuity check reads shorted contacts (1-2).

1. This is mandatory. Refer to "Adjustments and Measurement" for these switches.
2. When replacing the fuse, confirm that it has the appropriate rating for these models.
3. When replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.

5.5 Avoid inserting nails, wire, etc. through any holes in the unit during operation

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any other holes or gaps, because such objects may work as an antenna and cause microwave leakage.

5.6 Confirm after repair

1. After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing. Microwaves might leak if screws are not properly tightened.
2. Make sure that all electrical connections are tight before inserting the plug into the wall outlet.
3. Check for microwave energy leakage. (Refer to procedure for measuring microwave energy leakage).

CAUTION
MICROWAVE RADIATION

DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

IMPORTANT NOTICE **NEW H.V.**

1. The following components have potentials above 250V while the appliance is operated.

- Magnetron
- High voltage transformer (Located on Inverter(U))
- High voltage diodes (Located on Inverter(U))
- High voltage capacitors (Located on Inverter(U))

Pay special attention on these areas.
When the appliance is operated with the door hinges or magnetron is fixed incorrectly, the microwave leakage can reach more than $5mW/cm^3$. After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly fixed.

5.7 Sharp edges

CAUTION

Please use caution when unpacking, installing or moving the unit, as some exposed edges may be sharp to touch and may cause injury if not handled with care.

6. DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

6.1 Magnetron

1. Discharge the high voltage capacitors.
2. Disconnect wire terminals to the thermal cutout.
3. Remove 1 screw holding the thermal cutout bracket to the magnetron.
4. Remove 1 screw holding the air guide A.
5. Remove 2 screws holding the tie bar.
6. Remove the oven lamp and lead wire harness cables from the air guide A.
7. Remove the air guide A
8. Disconnect the 2 high voltage lead wires from the magnetron.
9. Remove 4 screws holding the magnetron.

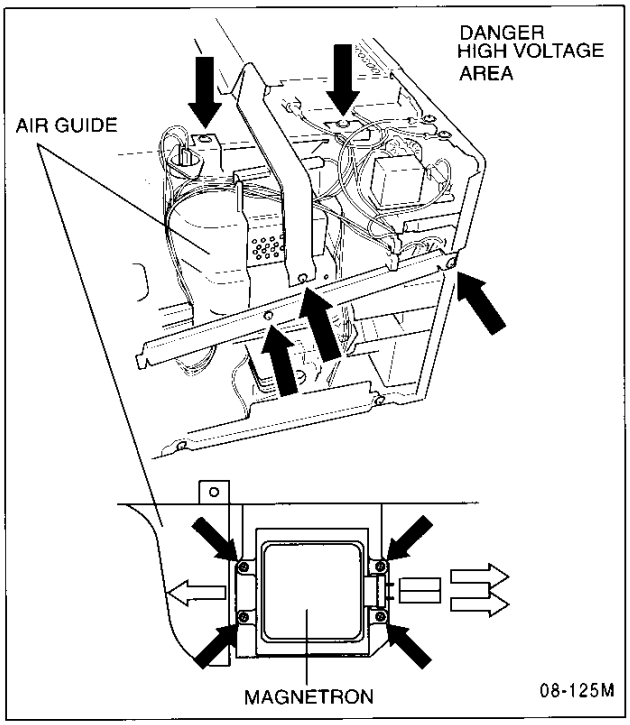
NOTE: After replacement of the magnetron, tighten mounting screws properly making sure there is no gap between the waveguide and the magnetron to prevent microwave leakage.

CAUTION

When replacing the magnetron, be sure the antenna gasket is in place.

NOTE

Magnetron used for this model is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

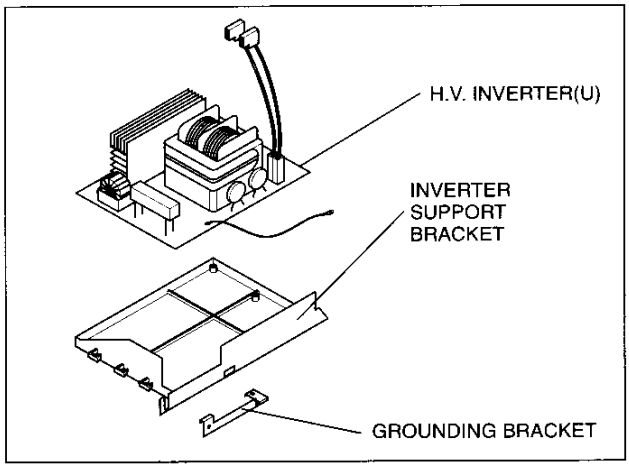


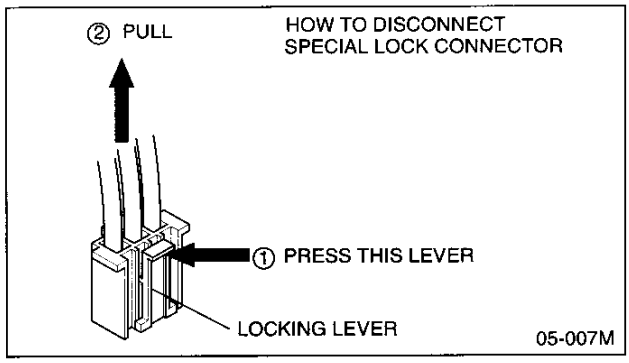
6.2 Inverter power supply (U) NEW H.V.

1. Discharge the high voltage capacitors.
2. Unplug 3 lead wire connectors from the inverter power supply board.
3. Remove 1 screw to release the inverter grounding bracket.
4. Remove 1 screw and remove the inverter PCB plus support base from the oven.
5. Remove 1 screw to disconnect earth wire to magnetron.
6. Remove 4 screws holding inverter power supply board to the Inverter bracket.
7. Replace with replacement PCB and follow the steps in reverse.

CAUTIONS WHILE REPLACING INVERTER POWER SUPPLY (U)

1. Make sure to leave grounding plate in its place.
2. Make sure to securely tighten grounding screw through the side of chassis (base).
3. Securely connect 3 lead wire connectors.
4. Make sure the heat sink has enough space (gap) from the oven. Take special care not to touch any lead wire to the aluminium heat sink because it is hot.

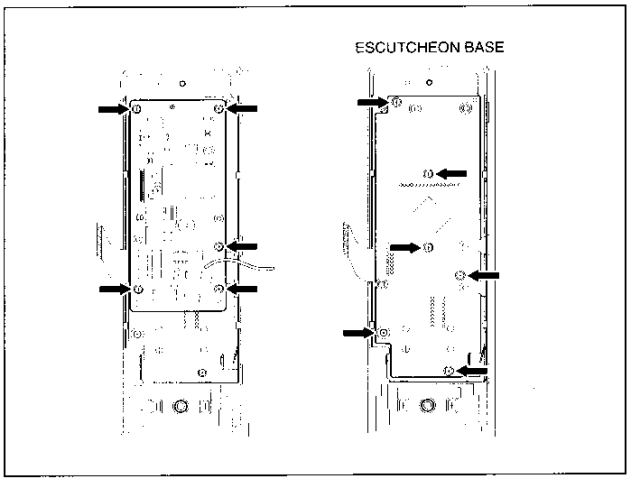




6.3 Digital Programmer Circuit (DPC) and membrane keyboard

NOTE: Be sure to ground any static electric charge built up on your body before handling the DPC.

1. Disconnect all electrical connectors to the DPC.
2. Remove 2 screws holding escutcheon base to oven chassis and slide the escutcheon base upward slightly.
3. Remove 1 screw holding the earth wire to the chassis.
4. Release the flat cable.
5. Remove 5 screws holding DPC DU (see fig).
6. Remove door opening lever.
7. Remove 2 PCB spacers.
8. Remove 6 screws holding DPC AU.
9. Remove DPC AU.



6.4 Low voltage transformer and/or power relays (RY1)

NOTE: Be sure to ground any static electric charge built up on your body before handling the DPC.

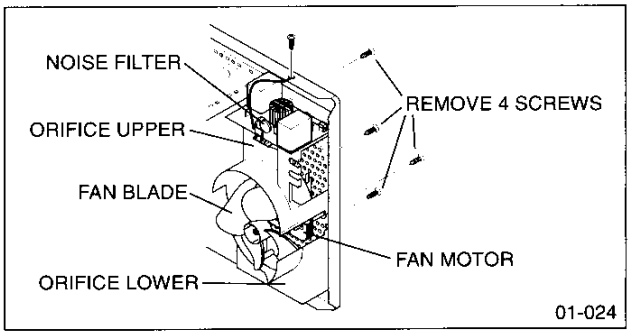
1. Using solder wick or a desoldering tool and 30W soldering iron, carefully remove all solder from the terminal pins of the low voltage transformer and/or power relays.

NOTE: Do not use a soldering iron or desoldering tool of more than 30 watts on DPC contacts.

2. With all the terminal pins cleaned and separated from DPC contacts, remove the defective transformer/power relays and install new transformer/power relays making sure all terminal pins are inserted completely. Resolder all terminal contacts carefully.

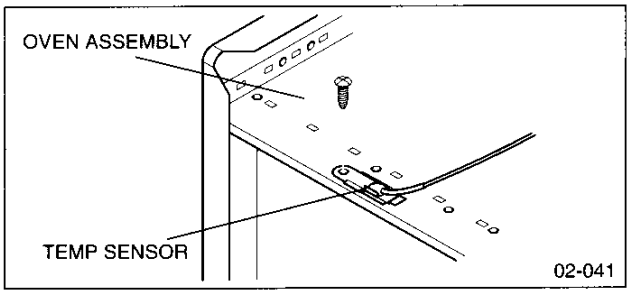
6.5 Fan motor

1. Remove 2 screws and remove tie bar.
2. Disconnect 2 lead wires from fan motor terminals.
3. Disconnect all lead wires from noise filter.
4. Remove the noise filter.
5. Remove 4 screws holding fan motor and upper and lower orifice. Detach the orifice assembly with fan motor from oven assembly.
6. Remove fan blade from the fan motor shaft by pulling it straight out.



6.6 Temp sensor (thermal protector)

1. Replace the temperature sensor by replacing the leadwire harness B as a complete unit.
2. Disconnect screw holding temperature sensor to chasis.
3. Disconnect connector CN4 from DPC DU.
4. Disconnect terminal from SW4 (secondary latch switch).
5. Replace as a whole unit.

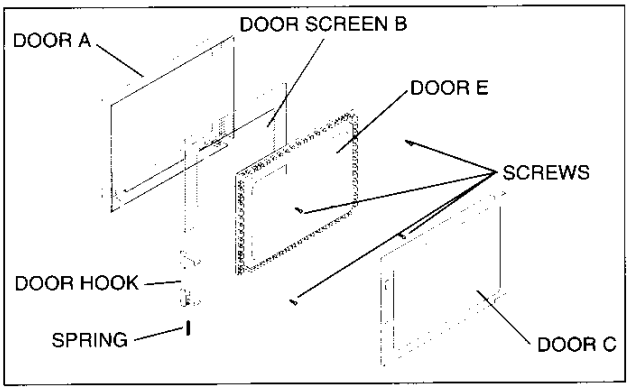


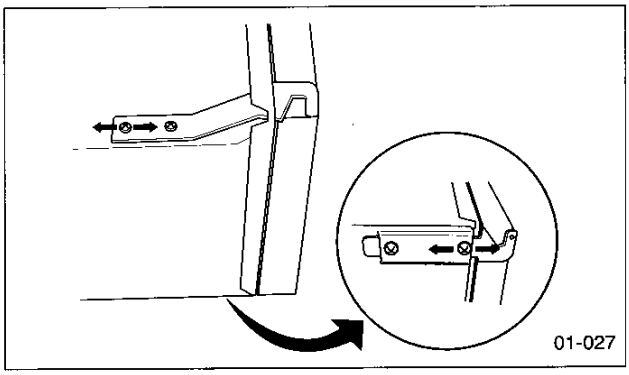
6.7 Door disassembly

1. Remove door C from door E by carefully pulling outward starting from upper right hand corner using a flat blade screwdriver.
2. Remove 4 screws holding door E to door A assembly to separate door E from door A.
3. Remove door key and door key spring.
4. Separate door screen B from door A by carefully levering the screen away from the plastic catch hooks.

After replacement of the defective component parts of the door, reassemble it and follow the instructions below for proper installation and adjustment so as to prevent an excessive microwave leakage.

1. When mounting the door to the oven, be sure to adjust the door parallel to the bottom line of the oven face plate by moving the upper hinge and lower hinge in the direction necessary for proper alignment.
2. Adjust so that the door has no play between the inner door surface and oven front surface. If the door assembly is not mounted properly, microwave power may leak from the clearance between the door and oven.
3. Perform the microwave leakage test.





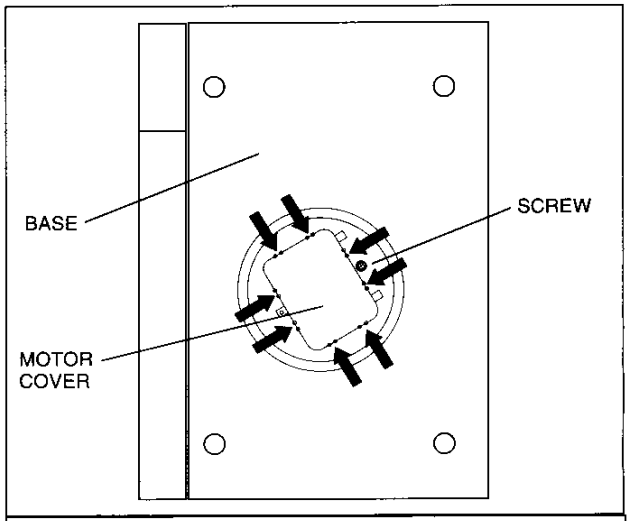
6.8 Turntable motor

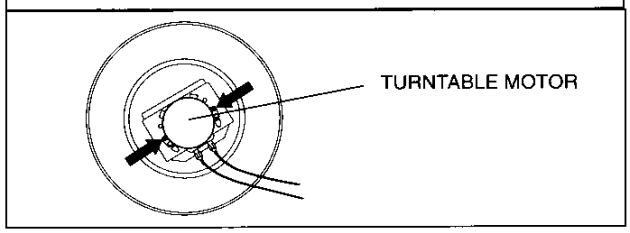
1. Remove the motor cover by breaking off at the 8 spots indicated by arrows. (See figure)

NOTE: After breaking off the motor cover, make sure that cut-off portions are properly trimmed off or bend to inside so that no sharp edge will expose to outside.

2. Disconnect 2 lead wires connected to the turntable motor.
3. Remove the turntable motor by removing 2 screws.

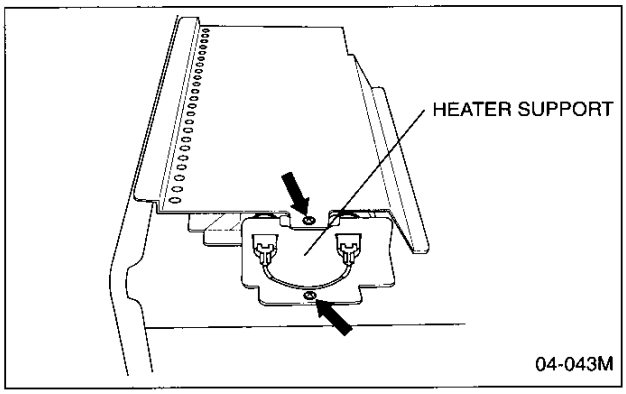
NOTE: To reinstall the motor cover, use 4x6 screw.

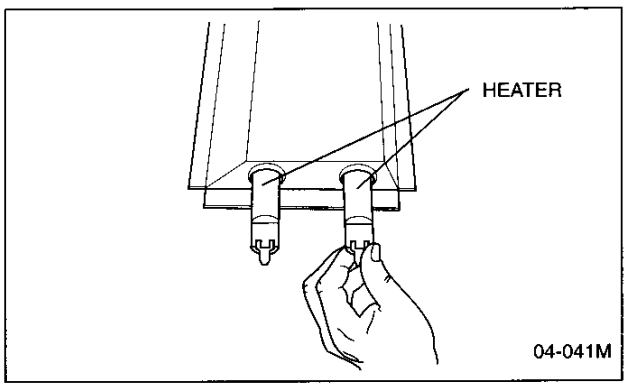




6.9 Quartz heater

1. Disconnect lead wires from heater terminals.
2. Remove 1 screw holding heater supports.
3. Remove the heater.





7. COMPONENT TEST PROCEDURE

CAUTION NEW H.V.

1. High voltage is present at the high voltage terminal of the high voltage inverter (U) including aluminium heat sink during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitors.

7.1 Primary latch switch, secondary (secondary latch switch and power relay B) interlocks

1. Unplug the lead connectors to power relay B and verify continuity of the power relay B 1-2 terminals.
2. Unplug lead connectors to primary latch switch and secondary latch switch.
3. Test the continuity of switches at door opened and closed positions with ohm meter (low scale).

   Normal continuity readings should be as follows.

	Door Opened	Door Closed
Primary Latch Switch	∞ Ω (open)	0 Ω (close)
Secondary Latch Switch	∞ Ω (open)	0 Ω (close)
Power Relay B	∞ Ω (open)	∞ Ω (close)

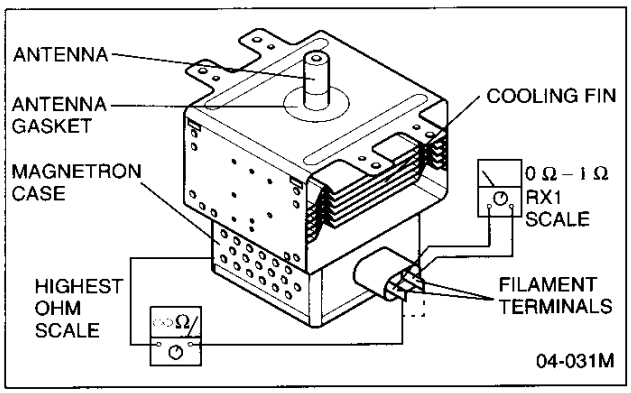
7.2 Short switch and monitor circuit

NEW H.V.

1. Unplug lead wires from H.V. inverter primary terminals.
2. Connect test probes of ohm meter to the disconnected leads which were connected to H.V. inverter.
3. Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.

   Normal continuity readings should be as follows.

Door Opened	Door Closed
0 Ω	∞ Ω



7.3 Magnetron

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

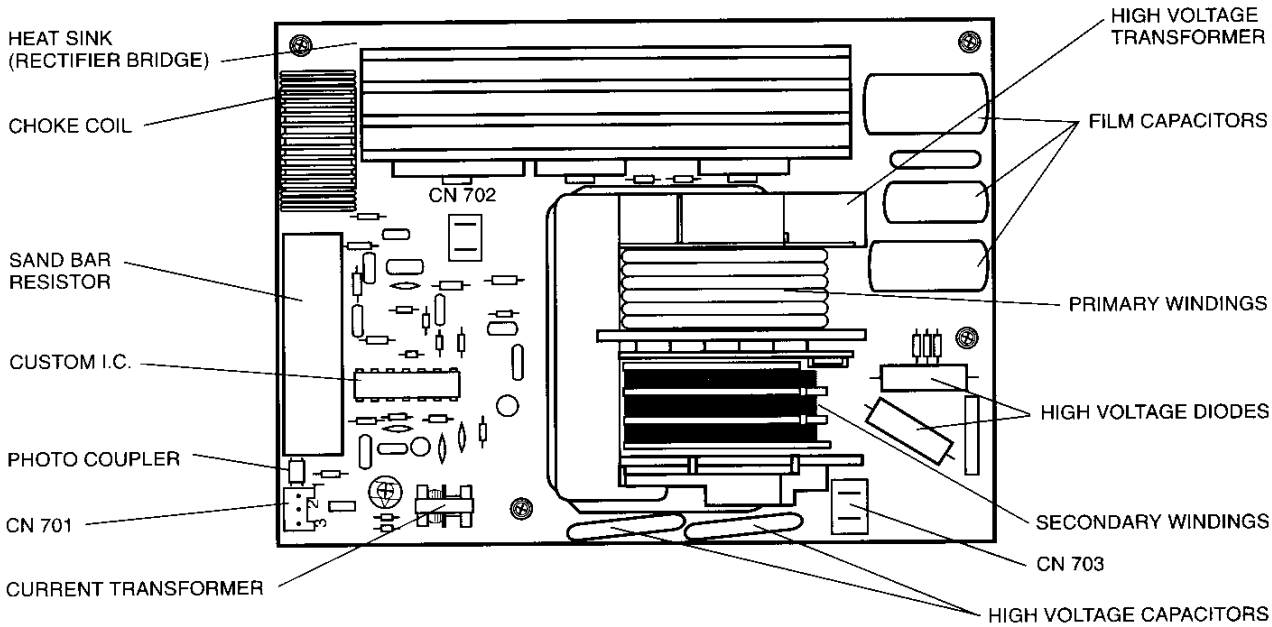
1. Isolate magnetron from the circuit by disconnecting the leads
2. A continuity check across magnetron filament terminals should indicate one ohm or less.
3. A continuity check between each filament terminal and magnetron case should read open.

7.4 Push button key board

Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit (schematic).

7.5 Inverter power supply (U)

DO NOT try to REPAIR this H.V. inverter power supply (U). Replace as whole H.V. inverter (U) unit.



INVERTER POWER SUPPLY DIAGRAM

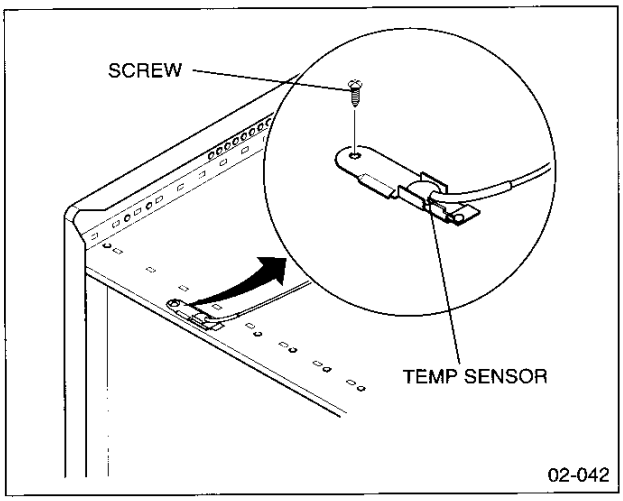
7.6 Inverter power supply (U) NEW H.V.

WARNING
Do not attempt to make any measurements in the high voltage circuitry of the inverter or magnetron.

See Troubleshooting of inverter circuit and magnetron on Pages 19 and 20 to determine if the inverter power supply is functioning.

7.7 Temp sensor (thermal protector)

A temp sensor is mounted on top of the oven cavity at the left side. Its purpose is to automatically shut off the oven in case the cavity overheats for any reason.
The thermal protector will shut the oven down when the temperature of the cavity reaches 257°F (125°C).
The device is connected to the DPC on touch control models. When the thermal protector exceeds its temperature it will turn off the power to oven cavity and display will go to reset mode. The cooking program can be reset after cool-down.
THERMISTOR RESISTANCE VALUE
30K-120K at 10°C-30°C (50°F-86°F)



8. MEASUREMENTS AND ADJUSTMENTS

WARNING

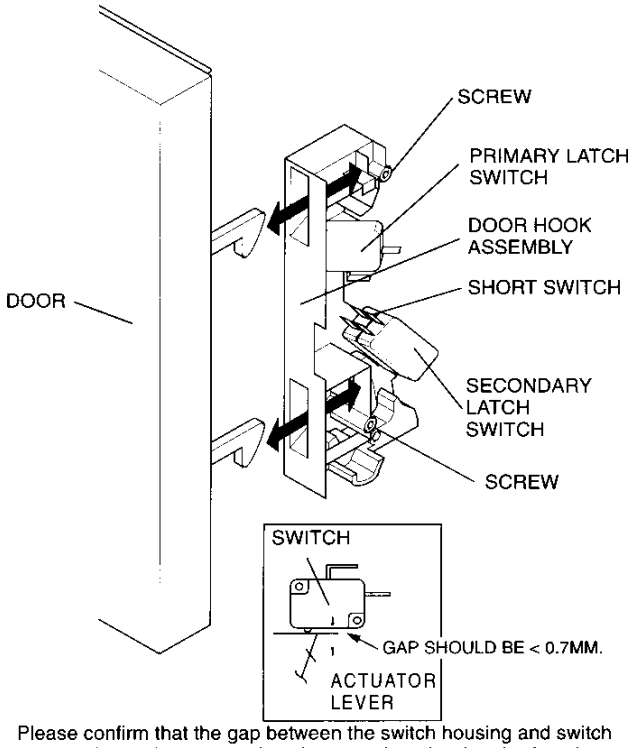
- For continued protection against radiation hazard, replace only with identical replacement parts.
- When the 10 Amp. fuse is blown due to the operation of short switch, you must replace the primary latch switch and short switch. Then follow the installation procedures below.
- Interlock switch replacement - In replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.
- Refer to schematic diagram to ensure proper connection.

8.1 Installation of primary latch switch, secondary latch switch and short switch

1. Mount the primary latch switch, the secondary latch switch and the short switch to the door hook assembly as shown in the illustration.

NOTE: No specific adjustment during installation of primary latch switch, secondary latch switch and short switch to the door hook is necessary.

2. When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of arrow in the illustration so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.
3. Reconnect the short switch, primary and secondary latch switches and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.



Please confirm that the gap between the switch housing and switch actuator levers is no more than 0.7 mm when the door is closed.

01-033

8.2 Measurement of microwave output

The output power of the magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.

Necessary Equipment:

*1 litre beaker

*Glass thermometer

*Wrist watch or stopwatch.

NOTE: Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurate as possible.

1. Fill the beaker with exactly one litre of tap water. Stir the water using the thermometer and record the beaker's temperature (recorded as T1).
2. Place the beaker on the center of glass cook plate.
3. Set to high power and heat for exactly one minute.
4. Stir the water again and read the temperature of the beaker (recorded as T2).
5. The normal temperature rise at High power position for each model is as shown in table.

TABLE (1 ℓ - 1min. test)

RATED OUTPUT	TEMPERATURE RISE
900W (IEC705-88)	(8°C)

9. TROUBLESHOOTING GUIDE NEW H.V.

CAUTION

1. **DO NOT try to REPAIR this H.V. Inverter power supply(U). Replace as whole H.V. Inverter(U) Unit.** When returning H.V. Inverter(U) make sure to pack as originally packed.
2. **DO NOT RE-ADJUST PRESET VOLUME on the H.V. Inverter(U).** It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very large current with very high voltage.
3. Ensure proper grounding before checking for trouble.
4. Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.
5. Discharge the high voltage that remains in the Inverter(U).
6. When checking the continuity of the switches or the H.V. Inverter, disconnect one lead wire from these parts and then check continuity with the AC plug removed. To do otherwise may result in a false reading or damage to your meter. When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be open or the connector cannot be removed.
7. Do not touch any parts of the circuitry on the digital programmer circuit, since static electric discharge may damage this control panel.
   Ensure you are touching the ground while working on this panel to discharge any static charge in your body.
8. 240VAC is present on the digital programmer circuit (Terminals of power relay's and primary circuit of low voltage transformer). When troubleshooting, be cautious of possible electrical shock hazard.

Before troubleshooting, operate the microwave oven following the correct operating procedures in the instruction manual in order to find the exact cause of any trouble, since operator error may be mistaken for the oven's malfunction.

	SYMPTOMS	CAUSE	CORRECTIONS
1.	Oven is dead. Fuse is OK. No display and no operation at all.	1. Open or loose lead wire harness. 2. Open thermal cutout (Magnetron) 3. Open low voltage transformer 4. Defective DPC AU or DPC DU	Check fan motor when thermal cutout is defective.
2.	No display and no operation at all. Fuse is blown.	1. Shorted lead wire harness 2. Defective primary latch switch (NOTE 1) 3. Defective short switch (NOTE 1) 4. Defective Inverter power supply (U) NEW H.V. Refer to component test procedure (Page 23)	Check adjustment of primary, secondary latch switch and short switch including door.
		NOTE 1: All of these switches must be replaced at the same time. (Refer to adjustment instructions.) Check continuity of power relay B's contacts (between 1 and 2) and if it has continuity, replace power relay B also.	
3.	Oven does not accept key input (Program).	1. Key input is not in sequence. 2. Shorted push button on DPC AU. 3. Defective DPC AU.	Refer to operation procedure. Refer to DPC troubleshooting.
4.	Oven lamp and turntable motor turn on when oven is plugged in with door closed	1. Misadjustment or loose wiring of secondary latch switch. 2. Defective secondary latch switch	Adjust door and latch switches.
5.	Timer starts countdown but no microwave oscillation. (No heat while oven lamp and fan motor turn on)	1. Off-alignment of latch switches 2. Open or loose connection of high voltage circuit especially magnetron filament circuit NOTE: Large contact resistance will bring lower magnetron filament voltage and cause magnetron to have lower output and/or be intermittent. 3. Defective high voltage component H.V. Inverter NEW H.V. Magnetron 4. Open or loose wiring of power relay B 5. Defective primary latch switch. 6. Defective power relay B or DPC AU or DU.	Adjust door and latch switches. Check high voltage component according to component test procedure (Page 23) and replace if it is defective. Refer to DPC troubleshooting.
6.	Microwave output is low. Oven takes longer time to cook food.	1. Decrease in power source voltage 2. Open or loose wiring of magnetron filament circuit. (Intermittent oscillation) 3. Aging change of magnetron.	Consult electrician Refer to output test procedures by water temperature raising test.
7.	Turntable on when door is opened.	1. Shorted primary latch switch.	

	SYMPTOMS	CAUSE	CORRECTIONS
8.	Oven does not operate and returns to plugged in mode as soon as start pad is pressed.	1. Opened or loose wiring of temp sensor 2. Defective temp sensor	Check tighten screws on escutcheon base bracket, D.P.C board and temp sensor.
9.	Loud buzzing noise can be heard.	1. Loose fan and fan motor	
10.	Turntable motor does not rotate.	1. Open or loose wiring of turntable motor 2. Defective turntable motor	
11.	Oven stops operation during cooking.	1. Open or loose wiring of primary and secondary latch switch 2. Operation of thermal cutout (Magnetron)	Adjust door and latch switches.

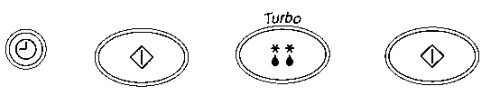
Troubleshooting of Inverter Circuit (U) and Magnetron NEW H.V.

Oven shuts down after approximately 15 or 33 seconds.

If the microwave oven shuts down after a short time in micropower mode, conduct the following test.

The microwave oven must be set in test mode to activate the self diagnostic failure code system.

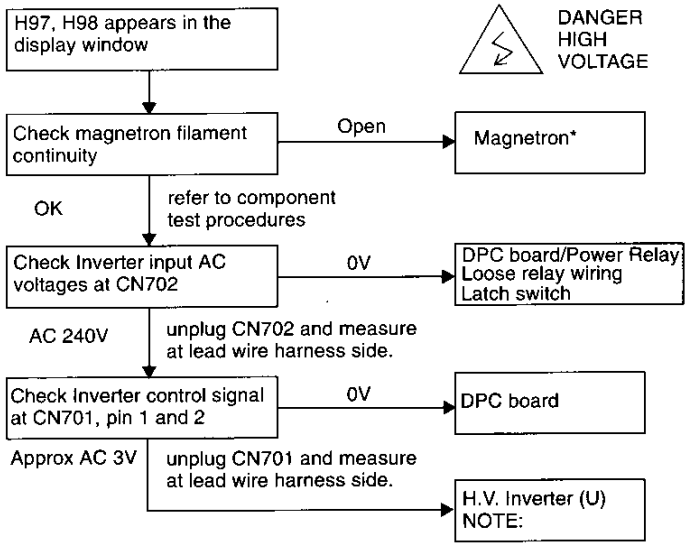
SELF TEST MODE



NN-F359WBSPG	NN-F369WBWPG	NN-F369WBSPG
4L5SPG	4L6WPG	4L6SPG

When oven is set in test mode place water load in oven, set micropower to high and time to 1 minute, press start.

H97, H98 appears in display window a short time after start key is pressed and there is no microwave oscillation.



NOTE: DO NOT try to REPAIR this Inverter Power Supply(U) and also DO NOT RE-ADJUST PRESET VOLUME on the board. It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very high voltage and very large current. Off alignment of inverter board operation is dangerous. Operating a misaligned Inverter circuit is dangerous due to the very high voltage and current that is produced by this board. Defective boards must be replaced with a new one.

*Check magnetron filament for open or short to casing before proceeding to determine a good magnetron.

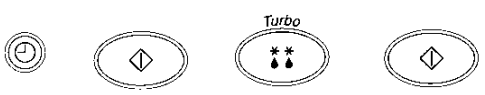
Alternative way to troubleshooting oven with AC Ampare meter used. NEW H.V.

Oven shuts down after approximately 15 or 33 seconds.

If the microwave oven shuts down after a short time in micropower mode, conduct the following test.

The microwave oven must be set in test mode to activate the self diagnostic failure code system.

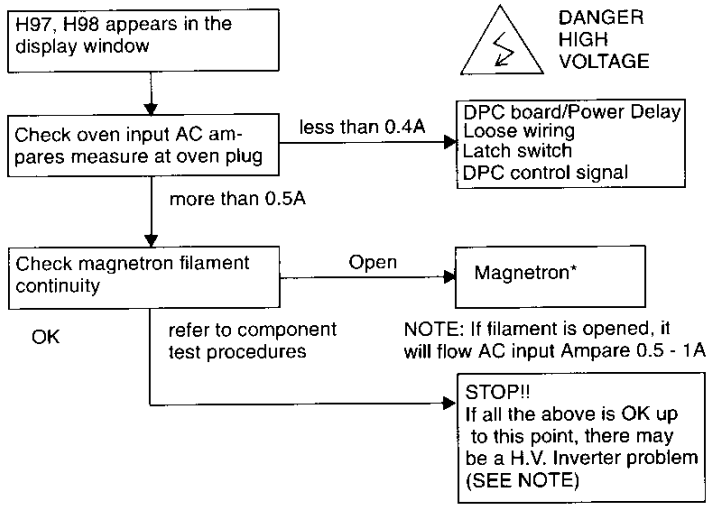
SELF TEST MODE



NN-F359WBEPG	NN-F369WBWPG	NN-F369WBSPG
4L5SPG	4L6WPG	4L6SPG

When oven is set in test mode place water load in oven, set micropower to high and time to 1 minute, press start.

H97, H98 appears in display window a short time after start key is pressed and no microwave oscillation with AC Ampare meter used for troubleshooting.


H97, H98 appears in the display window
DANGER
HIGH
VOLTAGE
Check oven input AC amperes measure at oven plug
less than 0.4A
DPC board/Power Delay
Loose wiring
Latch switch
DPC control signal
more than 0.5A
Check magnetron filament continuity
Open
Magnetron*
OK
refer to component test procedures
NOTE: If filament is opened, it will flow AC input Ampare 0.5 - 1A
STOP!!
If all the above is OK up to this point, there may be a H.V. Inverter problem (SEE NOTE)

NOTE: DO NOT try to REPAIR this Inverter Power Supply(U) and also DO NOT RE-ADJUST PRESET VOLUME on the board. It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very high voltage and very large current. Off alignment of inverter board operation is dangerous. Operating a misaligned Inverter circuit is dangerous due to the very high voltage and current that is produced by this board. Defective boards must be replaced with a new one.

*Check magnetron filament for open or short to casing before proceeding to determine a good magnetron.

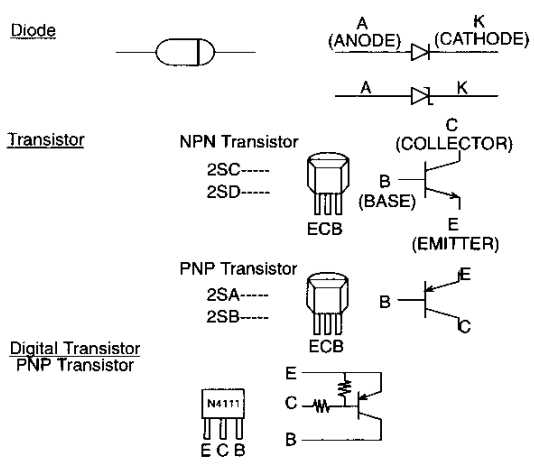
Trouble Related to Digital Programmer Circuit

SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in. Oven is dead.	1	Fuse pattern of DPC	Normal	STEP 2
			Open (NOTE)	Shorted Circuit of ZNR, L.V.T., Oven Lamp etc. Replace DPC
	2	IC10 Pin 9 (12V line)	Abnormal 0V	IC10
			Normal 12V	→ Step 3
	3	IC-1 Pin 16 voltage (Emitter of Q10)	Abnormal	ZD10, Q10, Ribbon Cable
			Normal = 5V	→ Step 4
	4	IC-1 pin 10 voltage (15 pin of IC220)	Abnormal	IC-220
			Normal	→ IC-1, CX1

NOTE
Procedure of fuse pattern repairing is as follows:
1. When the fuse pattern (PF2) opens.
(1) Remove the jumper wire (PF3).
(2) Insert the removed jumper wire (PF3) to "(PF2)" position and solder it. If both "PF2" and "PF3" fuse patterns are open, please replace DPC.
NOTE: * At the time of these repairs, make visual inspection of the varistor for burning damage and examine the transformer with tester for the presence of layer short-circuit (check primary coil resistance).
If any abnormal condition is detected, replace the defective parts.

SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No key input	1	Push button switch	Abnormal	Push button switch
			Normal	IC-1
No beep sound	1	IC-1 pin 8, voltage	Abnormal	IC-1
			Normal	IC220, BZ310
Power relay A(RY-2) does not turn on even though the program has been set and the start pad is tapped.	1	IC-1 pin 11 voltage while operation	Abnormal	IC-1
			Normal = 5V	→ Step 2
	2	Short circuit between pin 6 and pin 16 of IC-2	Still not turn on	RY-2
			RY-2 turns on	IC-220
No microwave oscillation at any power setting.	1	IC-1 pin 7 and 72 voltages while operation at high power	Abnormal	IC-1
			Normal 7---5V, 72---5V	→ Step 2
	2	Q220 transistor	Abnormal	Q220
			Normal	IC220
Dark or unclear display	1	Replace display and check operation	Normal	DISPLAY
			Abnormal	IC-1
Missing or lighting of unnecessary segment	1	Replace IC-1 and check operation	Normal	IC-1
			Abnormal	DISPLAY
Oven shuts down on Micropower after a short time (set in test mode) (set high power 1 Min) H97/H98 appears in window and oven stops operation. Program High power for 1 minute and conduct following test quickly, unless H97/H98 appears and oven stops. NEW H.V.	1	Unplug CN702(2 pin) connector and measure voltage between terminals	0V	1. Latch switch 2. DPC/Power relay
			AC line voltage of 240V	→ Step 2
	2	Unplug CN701(3 pin) connector and measure pin 1 voltage	0V	1. DPC
			Approx. AV 3V	1. Magnetron 2. Inverter

How to Check the Semiconductors Using an OHM Meter



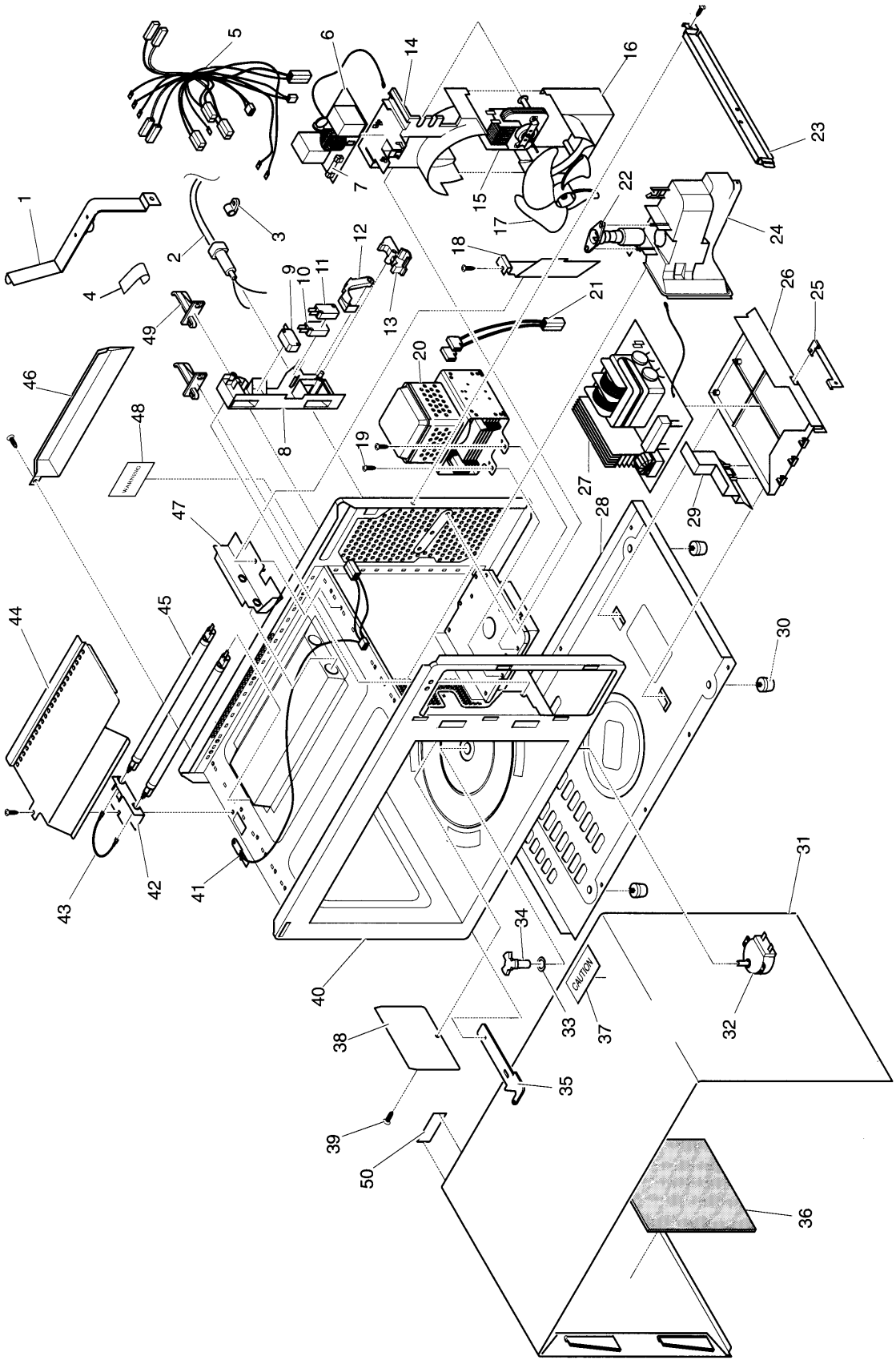
	FORWARD	REVERSE
A-K	SMALL	∞

	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

	FORWARD	REVERSE
E-B	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

	FORWARD	REVERSE
E-B	10kΩ~30kΩ	10kΩ~30kΩ
C-B	50kΩ~90kΩ	∞
C-E	40kΩ~80kΩ	∞

10. EXPLODED VIEW AND PARTS LIST

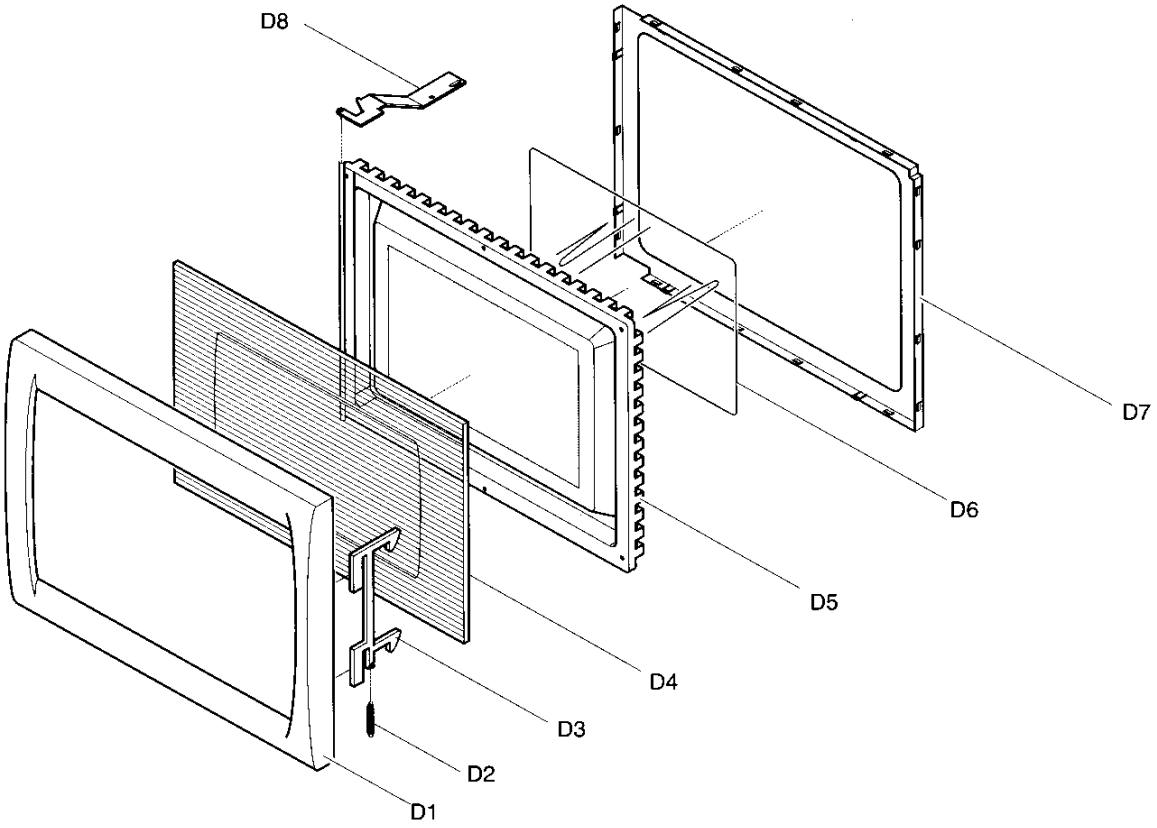


11. PARTS LISTS

NOTES: *When ordering replacement part(s), please use part number(s) shown in this parts list.
Do not use description of the part.
*Important safety notice:
Components identified by ! mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

Ref. No		Part No.	Part Name and Description	Pcs/set	Remarks
1	!	E610U4L50GS	THERMAL CUTOUT ASSEMBLY	1	
2	!	E900C4L50GS	POWER CORD	1	NN-F359WB SPG NN-F369WB SPG
2	!	E900C4L50WP	POWER CORD	1	NN-F369WB WPG
3		AEE9108A20GN	POWER CORD CLIP	1	
4		E02396750SP	POWER CORD LABEL	1	NN-F359WB SPG NN-F369WB SPG
5	!	E030A4L50GS	LEADWIRE HARNESS	1	
6	!	E607X4L00BP	NOISE FILTER ASSEMBLY	1	
7	!	E67597550GP	10A FUSE	1	
8	!	E30208000BP	DOOR HOOK	1	
9	!	AEE6142-F61	PRIMARY LATCH SWITCH	1	V-15G-3C26
10	!	E61785180AP	SHORT SWITCH	1	L-2C2-2
11	!	E61425180AP	SECONDARY SWITCH	1	L-3C2-2
12	!	E31384830AP	HOOK SPACER C	1	
13	!	E31374830AP	HOOK SPACER B	1	
14		E41444L00GS	UPPER ORIFICE	1	
15	!	E400A4760JP	FAN MOTOR	1	
16		E42094L00GS	LOWER ORIFICE	1	
17		E4008-1640	FANBLADE	1	
18		E40314L00GS	AIR GUIDE C	1	
19	!	XTWANE4+12B	SCREWS	4	FOR MAGNETRON
20	!	2M236-M42G	MAGNETRON	1	
21	!	E030E4L00GS	H.V.LEADWIRE	1	
22	!	E610T6700BP	OVEN LAMP	1	
23		E20994L00GS	TIE BAR	1	
24	!	E40254L00GS	AIR GUIDE A	1	
25	!	E66014L00GS	INVERTER EARTH BRACKET	1	
26	!	E65854L00GS	INVERTER SUPPORT BRACKET	1	
27	!	E606Y4L10GP	INVERTER	1	
28		E10014L00GS	BASE PLATE	1	
29		E10614L00GS	WATER SHEILD	1	
30		E1008-1180	RUBBER FOOT	4	
31		E110D4L00HBP	OUTER PANEL	1	
32	!	E63268960JP	TURNTABLE MOTOR	1	
33		AEE2177-F80	PULLEY SHAFT WASHER	1	
34		E21315540AP	PULLEY SHAFT	1	
35		E30074L00GS	LOWER HINGE	1	
36		E09020000UK	CUSHION	1	
37	!	E01505870GS	WARNING LABEL	1	
38	!	E20554L00GS	COVER A	1	
39	!	XT4+W5V	SCREW	1	H1 TORQUE FOR COVER A
40		E200A4L50GS	OVEN CAVITY	1	
41	!	E030F4L00GS	LEADWIRE HARNESS B	1	INC. THERMISTOR
42		E64924L50GS	LEFT HEATER BRACKET	1	
43		E03596540GP	GRILL LINK	1	
44		E22784L50GS	UPPER HEATER PANEL	1	
45		E630G7550GP	GRILL HEATER	1	
46		E40244N30BP	EXHAUST GUIDE	1	
47		E64604L50GS	RIGHT HEATER BRACKET	1	
48	!	E00069000EP	WARNING LABEL	1	
49		E11406520GP	STOPPER A	2	
50		E66224L50GS	OUTER PANEL SPACER	1	

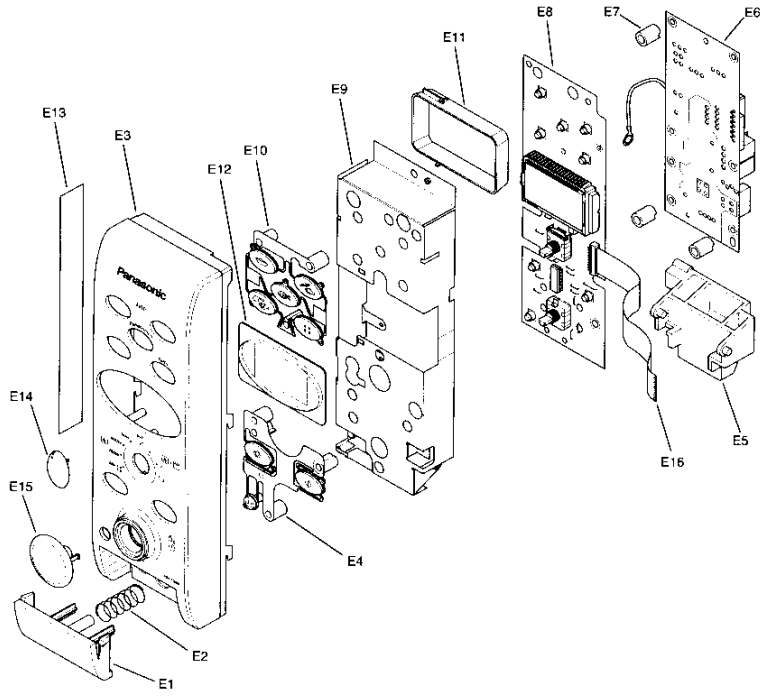
12. DOOR ASSEMBLY



Ref. No.		Part No.	Part Name and Description	Pcs/Set	Remarks
D1		E30014L20HBP	DOOR A	1	NN-F369WB NN-F359WB
D2		E30214000AP	DOOR KEY SPRING	1	
D3		E30184L00GS	DOOR KEY A	1	
D4		E31464L60UP	DOOR SCREEN B	1	
D5	!	E302K4L00GS	DOOR E AND SCREEN A UNIT	1	
D6		E31454L00GS	SCREEN A	1	
D7		E30854L00GS	DOOR C	1	
D8		E30064L00GS	UPPER HINGE	1	

NOTE: When ordering any door component also order door C as this part may become damaged during disassembly.

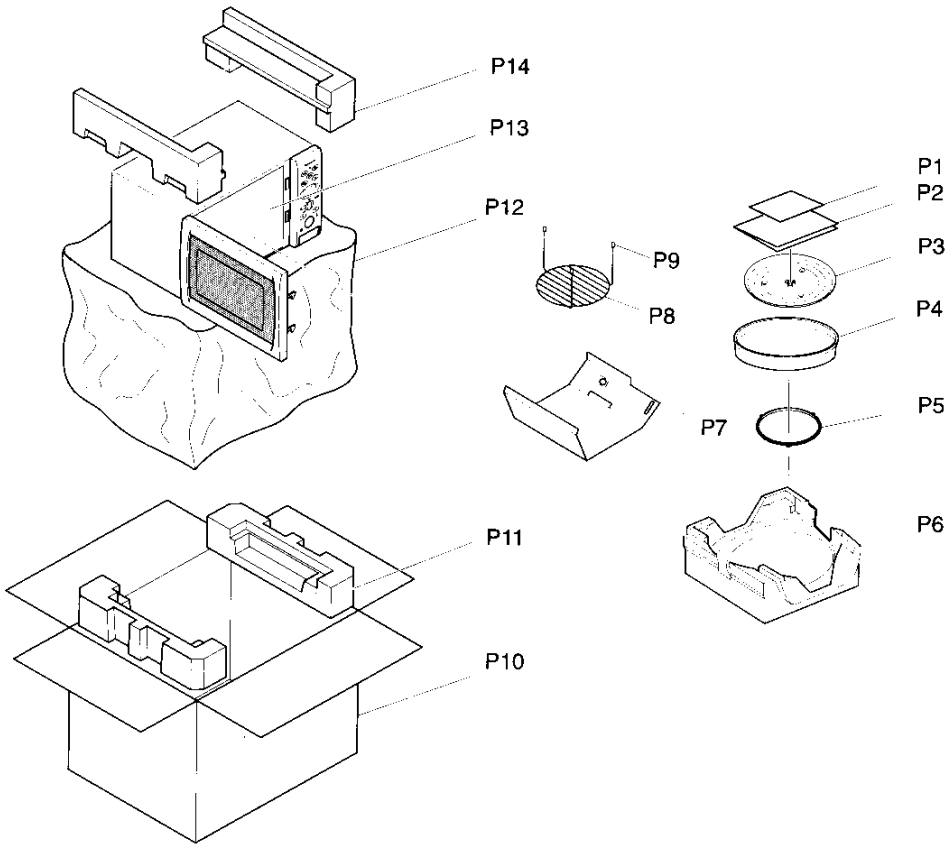
13. ESCUTCHEON BASE ASSEMBLY



Ref. No.		Part No.	Part Name and Description	Pcs/Set	Remarks
E1		E80724L10HBP	DOOR OPENING BUTTON	1	
E2		E80378AOAG	DOOR BUTTON SPRING	1	
E3		E80344L60HUP	ESCUTCHEON BASE	1	NN-F369 WB SPG NN-F369WB WPG
E3		E80344L50HUP	ESCUTCHEON BASE	1	NN-F359 WB SPG
E4		E83874L60HUP	START/STOP BUTTON	1	
E5		E82564L10BP	DOOR OPENING LEVER	1	
E6		E603Y4L20BP	DPC DU	1	
E7		E83094L60UP	PCB SPACER	1	
E8		E603L4L60SP	PCB ASSEMBLY AU	1	NN-F369 WB SPG NN-F369WB WPG
E8		E603L4L50SP	PCB ASSEMBLY AU	1	NN-F359 WB SPG
E9		E81274L60UP	ESCUTCHEON BACKPLATE	1	
E10		E80244L60HUP	OPERATION BUTTON	1	NN-F369 WB SPG NN-F369WB WPG
E10		E80244L50HUP	OPERATION BUTTON		NN-F359 WB SPG
E11		E80164L60UP	DISPLAY SPACER	1	
E12		E81894L60UP	DISPLAY WINDOW	1	
E13		E00074L50GP	NAMEPLATE	1	
E14		E83924L60HUP	SELECT KNOB	1	
E15		E80204L60HUP	T. S. KNOB	1	
E16		E66164L60UP	RIBBON CABLE	1	

NOTE: When ordering E3 also order E13 Nameplate.

14. PACKING AND ACCESSORIES

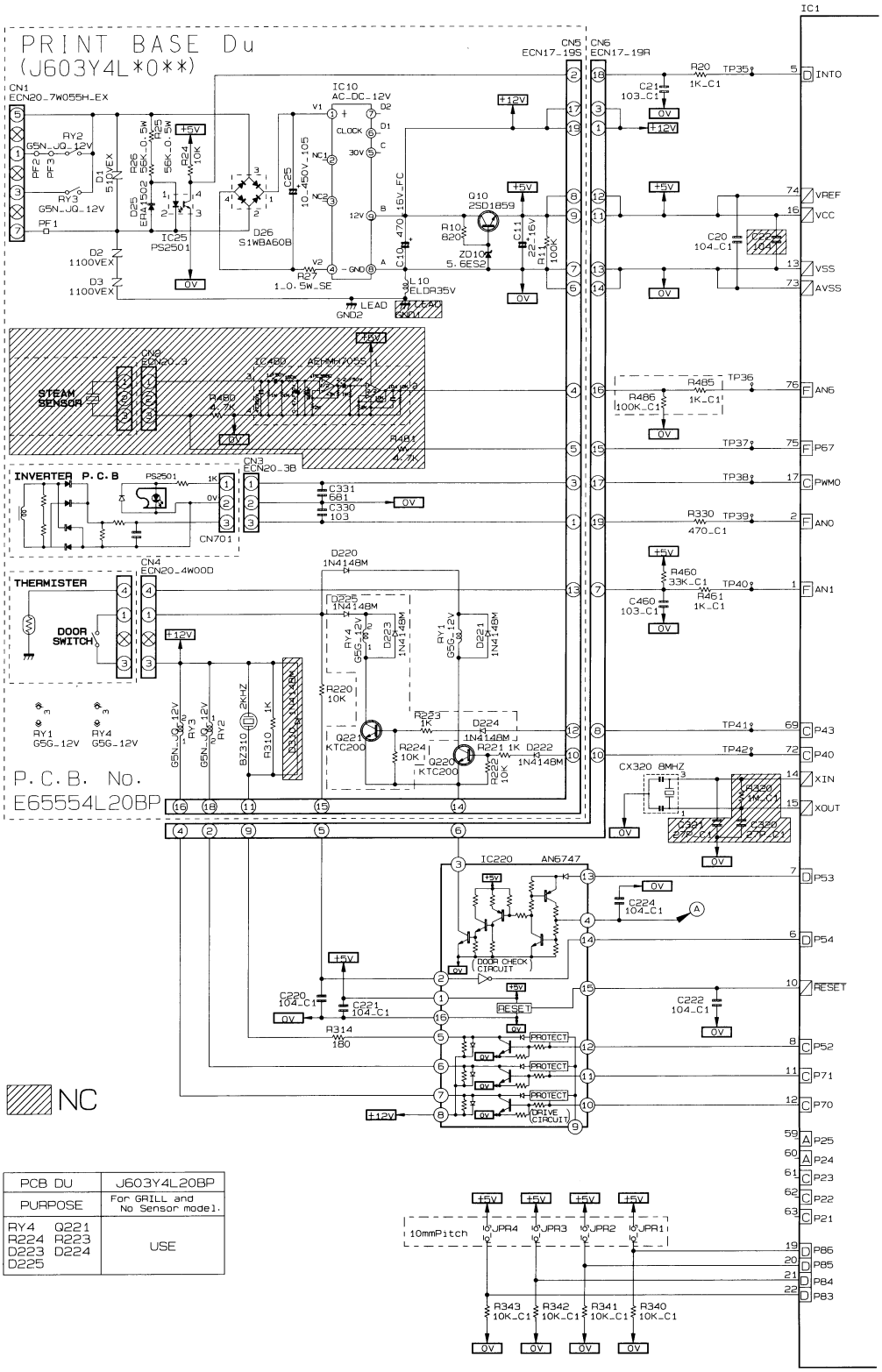


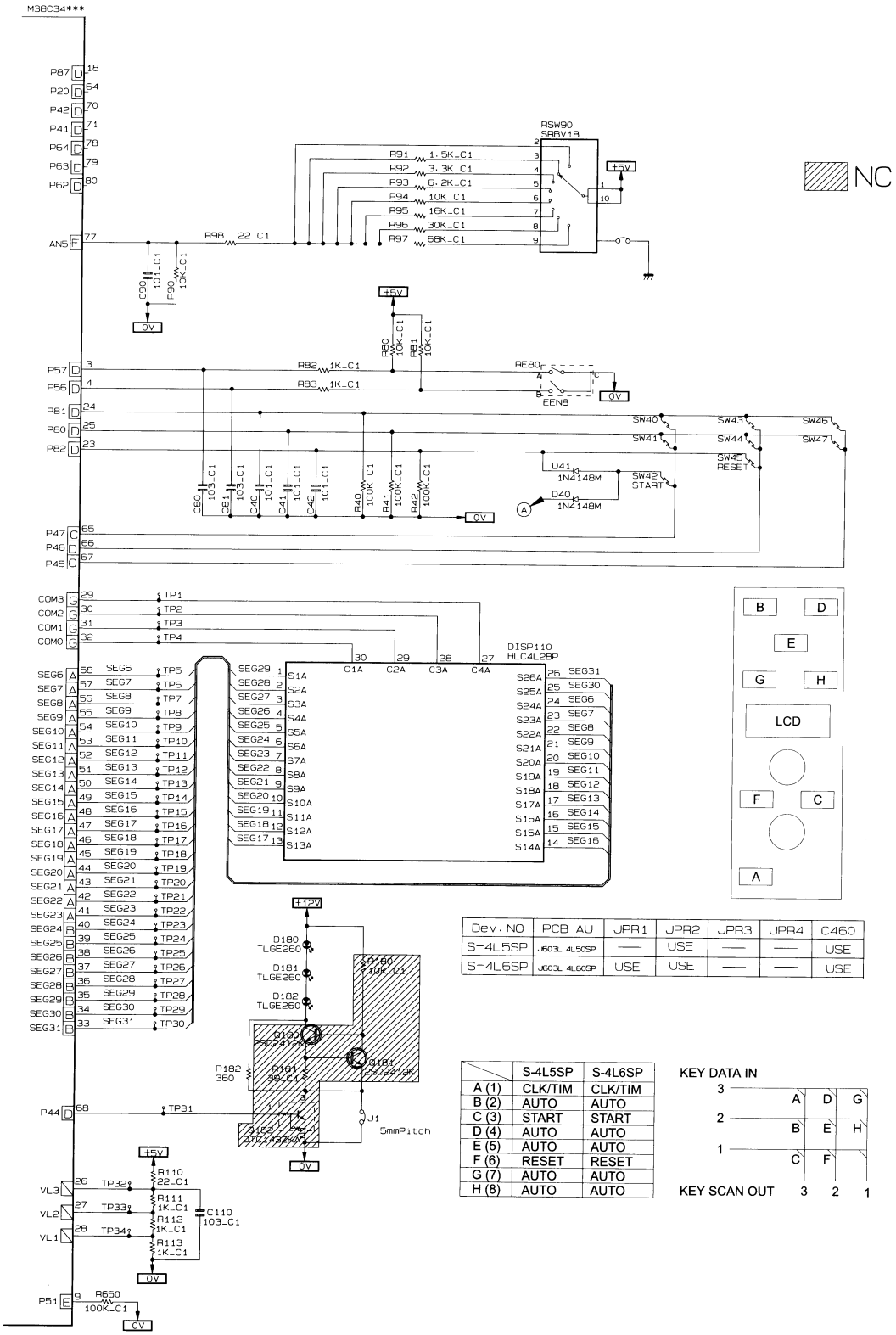
Ref. No.		Part No.	Part Name and Description	Pcs/Set	Remarks
P1		E01695750BP	SERVICE CENTER LIST	1	
P2		E00034L50SP	INSTRUCTION BOOK / COOK BOOK	1	NN-F369WB SPG NN-F359 SPG
P2		E00034L60WP	INSTRUCTION BOOK / COOK BOOK	1	NN-F369 WPG
P3		E06014L00BP	GLASS TRAY	1	
P4		E060W4L60UP	CRISP PAN	1	NN-F369WB SPG NN-F369WB WPG
P5		E290D6150WN	ROLLER RING	1	
P6		E01134L60UP	TRAY STYROL	1	NN-F369WB SPG NN-F369WB WPG
P7		E01084L60UP	TRAY PACKING	1	NN-F369WB SPG NN-F369WB WPG
P7		E01084L00GS	TRAY PACKING	1	NN-F359WB SPG
P8		E060V4L50GS	WIRE RACK ASSEMBLY	1	
P9		E06435870GS	WIRE RACK FOOT	3	
P10		E01024L60HSP	CARTON BOX	1	NN-F369WB SPG
P10		E01024L60HWP	CARTON BOX	1	NN-F369WB WPG
P10		E01024L50HSP	CARTON BOX	1	NN-F359WB SPG
P11		E01054L00BP	LOWER FILLER	1	
P12		AEE01066Q0BP	VINYL COVER	1	
P13		E01078890BP	DOOR SHEET	1	
P14		E01044L00BP	UPPER FILLER	1	

E607X4L00BP - Noise Filter Assembly

Ref. No.	Part No.	Description	Qty	Remarks
R1	ERG1SJ753P	RESISTOR	1	75KΩ 1W
C1&C2	AECQJ5225KX1	CAPACITOR	2	2.2μf
C3&C4	ECKMNA472ME	CAPACITOR	2	4700pF 250V AC
L1	E621A4J00XN	FILTER COIL	1	2.4mH
GND	E03594080BP	EARTH WIRE	1	
F1	E62316010BP	FUSE HOLDER	1	10A 250V AC

15. DIGITAL PROGRAMMER CIRCUIT





Dev. NO	PCB AU	JPR1	JPR2	JPR3	JPR4	C460
S-4L5SP	J603L 4L50SP	—	USE	—	—	USE
S-4L6SP	J603L 4L60SP	USE	USE	—	—	USE

	S-4L5SP	S-4L6SP
A (1)	CLK/TIM	CLK/TIM
B (2)	AUTO	AUTO
C (3)	START	START
D (4)	AUTO	AUTO
E (5)	AUTO	AUTO
F (6)	RESET	RESET
G (7)	AUTO	AUTO
H (8)	AUTO	AUTO

16. DIGITAL PROGRAMMER CIRCUIT - PARTS LIST

DPC AU - E603L4L50SP E603L4L60SP

Ref. No.	Part No.	Description	Qty	Remarks
CN6	AEEM19FESVKN	19PIN CONNECTOR	1	
DISP110	AEDDHLC4L2BP	LCD	1	
IC220	AN6747B	CUSTOM IC	1	
D180-D182	AESQTLGE260T	GREEN LED	3	
CX320	EF0EC8004T4	CERAMIC RESONATOR	1	
SW40-47	EVQ11L05R	PUSH SWITCH	8	
R182	ERDS2TJ361T	RESISTOR	1	360Ω
R314	ERDS2TJ181T	RESISTOR	1	180Ω
C40,C41,C42,C90	AECU1F101Z50	CAPACITOR	4	100pF
D40-41	AESS1N4148M	DIODE	2	
IC1	AEIC8C34A126	IC1	1	
C21"C110,C460,C80,C81"	AECU1F103Z50	CHIP CAPACITOR	5	10nF
"C20,C220-C222"C224	AECU1F104Z25	CHIP CAPACITOR	5	100nF
"R20,R111-R113"	ERJ3GSYJ102V	CHIP RESISTOR	7	1KΩ
"R461,R82,R83"				
"R340-R343,R90,R94,R80,R81"	ERJ3GSYJ103V	CHIP RESISTOR	8	10KΩ
"R650,R40,R42"	ERJ3GSY104V	CHIP RESISTOR	1	100KΩ
"R110,R98"	ERJ3GSYJ220V	CHIP RESISTOR	2	22Ω
R460	ERJ3GSYJ333V	CHIP RESISTOR	1	33KΩ
R330	ERJ3GSYJ471V	CHIP RESISTOR	1	470Ω
R91	ERJ3GSYJ152V	CHIP RESISTOR	1	1.5KΩ
R92	ERJ3GSYJ332V	CHIP RESISTOR	1	3.3KΩ
R93	ERJ3GSYJ662V	CHIP RESISTOR	1	6.2KΩ
R95	ERJ3GSYJ163V	CHIP RESISTOR	1	16KΩ
R96	ERJ3GSYJ303V	CHIP RESISTOR	1	30KΩ
R97	ERJ3GSYJ683V	CHIP RESISTOR	1	68K
RSW90	AEVQSRBV18	ROTARY SWITCH	1	
RE80	AEVQEC16B24G	ROTARY ENCODER	1	

DPC DU - E603Y4L20BP

Ref. No.	Part No.	Description	Qty	Remarks
CN5	AEEM19FEBVKN	19 PIN CONNECTOR	1	
CN1	AEEMMD05507W	7 PIN CONNECTOR	1	
"RY1,RY4"	AEGG5G1A12	RELAY	2	12V
"RY2,RY3"	AEBGG5N1A12	RELAY	2	12V
D1	ERZV10D511CS	VARISTOR	1	
"D2,D3"	ERZV10D112C1	VARISTOR	2	
1C25	AEICP25011HL	PHOTOCOUPLER	1	
D26	AESTS1WBA60B	DIODE BRIDGE	1	
BZ310	EFBAH20C001	BUZZER	1	2KHz
IC10	ETXMJ197X1BG	SWITCH POWER SUPPLY	1	
CN3	AEEMMF00703B	3 PIN CONNECTOR	1	
CN4	AEEMMF00D04W	4 PIN CONNECTOR	1	
L10	EXCELDR35V	INDUCTOR	1	
"Q220,Q221"	AESCKTC200	NPN TRANSISTOR	1	
C11	ECEA1CKA220B	CAPACITOR	1	22μF 16V
C25	ECA2WHG100E	CAPACITOR	1	10μF 450V
C10	EEUFC1C471B	CAPACITOR	1	470μF 16V
R27	ERX12SJ1R0E	RESISTOR	1	1Ω 1/4W
Q10	2SD1859TV2	POWER TRANSISTOR	1	
"R220,R222,R224"	ERDS2TJ103T	RESISTOR	4	10KΩ 10%
R24				
C330	ECBT1E103ZF5	CAPACITOR	1	10nF
C331	ECBT2H681KB5	CAPACITOR	1	68pF
R11	ERDS2TJ104T	RESISTOR	1	100KΩ 5%
"R221,R223,R310"	ERDS2TJ102T	RESISTOR	3	1KΩ 5%
R10	ERDS2TJ821T	RESISTOR	1	820Ω
D220-D225	AESS1N4148M	DIODE	6	
D25	AEDNERA1502	DIODE	1	
ZD10	AEDZ5R6ES2T1	ZENER DIODE	1	
"R26,R25"	ERDS1FJ563T	RESISTOR	2	56KΩ 1/2W